

226/132
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

Docket No. 226/132

Anticipated Classification of this application:
Class 370 Subclass
Prior application:
Examiner: M. Banks-Harold
Art Unit: 2611

ASSISTANT COMMISSIONER
FOR PATENTS
Washington, D.C. 20231

FILING UNDER 37 CFR 1.60

This is a request for filing for a

X continuation divisional

application under 37 CFR 1.60 of pending prior application Serial No. 08/410,901 filed on March 27, 1995

of ROBERT C. DIXON

for THREE-CELL WIRELESS COMMUNICATION SYSTEM

1. COPY OF PRIOR APPLICATION AS FILED WHICH IS ATTACHED

X I hereby verify that the attached papers are a true and complete copy of what is shown in my records to be the above-identified prior application, including the oath or declaration as originally filed.
(37 CFR 1.60)

13 Pages of Specification

3 Pages of Claims

1 Pages of Abstract

3 Sheets of Drawings formal X informal

2 Pages of Declaration

2 Pages of Assignment

1 Page of Power of Attorney

2. AMENDMENTS

X Cancel in this application original Claims 2-16 of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)

X A Preliminary Amendment will follow.

3. FEE CALCULATION

CLAIMS FOR FEE CALCULATION				
	Number Filed	Number Extra	Rate	Basic Fee \$770.00
Total Claims	1 - 20 =		x \$ 22.00 =	00.00
Independent Claims	1 - 3 =		x \$ 80.00 =	0.00
Multiple Dependent Claim(s), if any			\$260.00 =	

The fee for extra claims is not being paid at this time.

Filing Fee Calculation	\$ 770.00
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4. DRAWINGS

____ Transfer the drawings from the prior application to this application and, subject to Item 16 below, abandon said prior application as of the filing date according to this application. A duplicate copy of this request is enclosed for filing in the prior application file. [May only be used if signed by (1) applicant, (2) assignee of record or (3) attorney or agent of record authorized by 37 CFR 1.138 and before payment of issue fee.] NOTE: DO NOT CHECK THIS IF PRIOR CASE IS NOT TO BE ABANDONED.]

Transfer the following sheet(s) of drawings from the prior application to this application.

X New drawings are enclosed _____ formal X informal

5. RELATE BACK - 35 U.S.C. 120

X Please amend the Specification to reflect the status of the continuation application as follows:

--This application is a continuation of co-pending application Serial No. 08/410,901 filed March 27, 1995, which is a continuation of Application Serial No. 07/682,050 filed April 8, 1991, now U.S. Patent No. 5,402,413 .--

6. FEE PAYMENT BEING MADE AT THIS TIME

<u>X</u>	Filing fee.	\$770.00
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**226/132
PATENT**

_____ Recording assignment. [**\$40.00**; 37 CFR 1.21(h)(1)] \$ _____

_____ Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached.
[**\$130.00**; 37 CFR 1.47 and 1.17(h)] \$ _____

_____ Petition fee to Suspend Prosecution for the Time Necessary to File An Amendment (New Application Filed Concurrently).
[**\$130.00**; 37 CFR 1.103 and 1.17(l)(1)] \$ _____

_____ For processing an application with a specification in a non-English language. [**\$130.00**; 37 CFR 1.52(d) and 1.17(k)] \$ _____

_____ Processing and retention fee.
[**\$130.00**; 37 CFR 1.53(d) and 1.21(l)] \$ _____

Total Fees Enclosed \$ **770.00**

7. METHOD OF PAYMENT OF FEES

 X Attached is a check in the amount of \$ **770.00**

_____ Charge Deposit Account No. **12-2475** in the amount of \$ _____. A duplicate of this transmittal is attached.

8. AUTHORIZATION TO CHARGE ADDITIONAL FEES

 X The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Deposit Account No. **12-2475**:

 X 37 CFR 1.16 (filing fees)

 X 37 CFR 1.16 (presentation of extra claims)

 X 37 CFR 1.17 (application processing fees)

9. INSTRUCTIONS AS TO OVERPAYMENT

 X Credit Deposit Account No. **12-2475**.

_____ Refund

10. **POWER OF ATTORNEY**

X A copy of the power of attorney from the prior application is enclosed.

X Address all future communications to:

LYON & LYON LLP
633 West Fifth Street, Suite 4700
Los Angeles, California 90071-2066

and direct all telephone calls to:

(408) 993-1555

Attention: Steven D. Hemminger, Reg. No. 30,755

Respectfully submitted,

LYON & LYON LLP

By: 

Steven D. Hemminger
Reg. No. 30,755

Dated: June 16, 1997

633 West Fifth Street
Suite 4700
Los Angeles, CA 90071-2066
(408) 993-1555

Omnipoint Corporation

{type name of assignee}

1365 Garden of the Gods Road, Colorado Springs, CO 80907

{address of assignee}

Assistant Corporate Secretary

{title of person authorized to sign on behalf of assignee}

1 This application is submitted in the name of inventor
2 Robert C. Dixon, a citizen of the United States residing in
3 Colorado Springs, Colorado, assignor to Omnipoint Data Company, a
4 Delaware corporation having an office at 2120 Hollow Brook Drive,
5 Colorado Springs, Colorado 80918.

6
7 S P E C I F I C A T I O N

8
9
10 TITLE OF THE INVENTION

11
12 THREE-CELL WIRELESS COMMUNICATION SYSTEM

13
14 BACKGROUND OF THE INVENTION

15
16 1. Field of the Invention

17
18 This invention relates to cellular radio communication.
19 More specifically, this invention relates to a cellular radio
20 communication system including a repeated pattern of three cells.

21
22 2. Description of Related Art

23
24 In a wireless communication system it is generally
25 necessary for a receiver to distinguish between those signals in
26 its operating region that it should accept and those it should
27 reject. A common method in the art is frequency division (FDMA),
28 in which a separate frequency is assigned to each communication

1 channel. Another common method in the art is time division
2 (TDMA), in which a separate timeslot in a periodic time frame is
3 assigned to each communication channel.

4
5 One problem which has arisen in the art is that
6 contiguous coverage of a large area using radio communication has
7 required a cellular configuration with a large number of cells,
8 and thus with only a small number of frequencies available per
9 cell. In an FDMA system, all relatively proximate cells, not
10 just adjacent cells, must operate on different frequencies, and
11 frequencies may be reused only sufficiently far away that
12 stations using those frequencies no longer interfere. In
13 general, with homogenous conditions and equal-power transmitters,
14 the distance between perimeters of like-frequency cells must be
15 at least two to three times the diameter of a single cell. This
16 had led to a seven-cell configuration now in common use for
17 cellular networks.

18
19 Another problem which has arisen in the art when the
20 cells are disposed in a three-dimensional configuration,
21 particularly in low-power applications where many transmitters
22 are in close proximity. In addition to avoiding interference
23 from close transmitters, these systems may require complex
24 techniques for handing off mobile stations from one cell to
25 another, and for reassigning unused frequencies. This makes the
26 physical location of each cell's central station critical, and
27 thus requires careful coordination of an entire communication
28 system layout.

U.S. Patent No. 4,790,000 exemplifies the art.

Accordingly, an object of this invention is to provide a wireless communication system including a pattern having a reduced number of cells. Other and further objects of this invention are to provide a communication system which is less complex, which allows for reduced cell size, which can easily be extended from a two-dimensional to a three-dimensional configuration, which can reject interference, and which allows independent installation of multiple communication systems.

SUMMARY OF THE INVENTION

The invention provides a wireless communication system including a repeated pattern of cells, in which base station transmitters and user station transmitters for each cell may be assigned a spread-spectrum code for modulating radio signal communication in that cell. Accordingly, radio signals used in that cell are spread across a bandwidth sufficiently wide that both base station receivers and user station receivers in an adjacent cell may distinguish communication which originates in one cell from another. (Preferably, adjacent cells may use distinguishable frequencies and distinguishable codes, but it is sufficient if adjacent cells use distinguishable frequencies and identical codes.) A repeated pattern of cells allows the codes each to be reused in a plurality of cells.

1 In a preferred embodiment, a limited number (three is
2 preferred) of spread-spectrum codes may be selected for minimal
3 cross-correlation attribute, and the cells may be arranged in a
4 repeated pattern of three cells, as shown in figure 1. Station
5 ID information may be included with data communication messages
6 so that base stations and user stations may distinguish senders
7 and address recipients. Mobile user stations may be handed off
8 between base stations which they move from one cell to the next.

9
10 In a preferred embodiment, codes may be assigned
11 dynamically for each cell by each of a plurality of independent
12 communication systems, after accounting for use by other systems.
13 Preferably, if a control station for a second system determines
14 that two codes are in use closest to it, it may select a third
15 code for use in its nearest cell, and dynamically assign codes
16 for other cells to account for that initial assignment. A
17 control station for the first system may also dynamically
18 reassign codes to account for the presence of the second system.
19 Preferably, this technique may also be applied to a three-
20 dimensional configuration of cells.

21
22 In a preferred embodiment, time division and frequency
23 division reduce the potential for interference between station
24 transmitters. In a preferred embodiment, each independent
25 communication system may dynamically assign (and reassign) a
26 frequency or frequencies to use from a limited number (three is
27 preferred) of frequencies, after accounting for use by other
28

1 systems, similarly to the manner in which codes are dynamically
2 assigned and reassigned from a limited number of codes.

4 BRIEF DESCRIPTION OF THE DRAWINGS

6 Figure 1 shows a repeated pattern of three cells.

8 Figure 2 shows a wireless communication system.

10 Figure 3 shows a region with a plurality of independent
11 communication systems.

13 DESCRIPTION OF THE PREFERRED EMBODIMENT

15 Figure 1 shows a repeated pattern of three cells.

17 Figure 2 shows a wireless communication system.

19 A wireless communication system 201 for communication
20 among a plurality of user stations 202 includes a plurality of
21 cells 203, each with a base station 204, typically located at the
22 center of the cell 203. Each station (both the base stations 204
23 and the user stations 202) generally comprises a receiver and a
24 transmitter.

26 In a preferred embodiment, a control station 205 (also
27 comprising a receiver and a transmitter) manages the resources of
28 the system 201. The control station 205 assigns the base station

1 204 transmitters and user station 202 transmitters in each cell
2 203 a spread-spectrum code for modulating radio signal
3 communication in that cell 203. Accordingly, radio signals used
4 in that cell 203 are spread across a bandwidth sufficiently wide
5 that both base station 204 receivers and user station 202
6 receivers in an adjacent cell 206 may distinguish communication
7 which originates in the first cell 203 from communication which
8 originates in the adjacent cell 206.

9
10 Preferably, adjacent cells 203 may use distinguishable
11 frequencies and distinguishable codes, but it is sufficient if
12 adjacent cells 203 use distinguishable frequencies and identical
13 codes. Thus, cells 203 which are separated by an intervening
14 cell 203 may use the same frequency and a distinguishable code,
15 so that frequencies may be reused in a tightly packed repeated
16 pattern. As noted herein, spread-spectrum codes which are highly
17 orthogonal are more easily distinguishable and therefore
18 preferred.

19
20 The cells 203 may be disposed in the repeated pattern
21 shown in figure 1. A cell 203 will be in one of three classes: a
22 first class A 207, a second class B 208, or a third class C 209.
23 No cell 203 of class A 207 is adjacent to any other cell 203 of
24 class A 207, no cell 203 of class B 208 is adjacent to any other
25 cell 203 of class B 208, and no cell 203 of class C 209 is
26 adjacent to any other cell 203 of class C 209. In a preferred
27 embodiment, three spread-spectrum codes may be preselected, such
28

1 as for minimal cross-correlation attribute, and one such code
2 assigned to each class of cells 203.

3
4 However, it would be clear to one of ordinary skill in
5 the art, after perusal of the specification, drawings and claims
6 herein, that alternative arrangements of the cells 203 would also
7 be workable. For example, the cells 203 might be arranged in a
8 different pattern. Alternatively, each base station 204 and each
9 user station 202 may be assigned a separate code, which may then
10 be used to identify that station. Hybrids between these two
11 extremes, such as assigning a common code to a designated class
12 of stations, may be preferred where circumstances indicate an
13 advantage. It would be clear to one of ordinary skill in the
14 art, that such alternatives would be workable, and are within the
15 scope and spirit of the invention.

16
17 In a preferred embodiment, only a single code is used
18 for all base stations 204 and user stations 202 in a single cell
19 203. A message 210 which is transmitted by a base station 204 or
20 a user station 202 may comprise a portion 211 which comprises
21 station ID information, such as a unique ID for the transmitting
22 station. This allows base stations 204 and user stations 202 to
23 distinguish the sender and to address the recipient(s) of the
24 message 210.

25
26 When a mobile user station 202 exits the first cell 203
27 and enters the adjacent cell 206, the user station 202 is "handed
28 off" from the first cell 203 to the adjacent cell 206, as is well

1 known in the art. Determining when the user station 202 should
2 be handed off may be achieved in one of several ways, including
3 measures of signal strength, bit error rate, cross-correlation
4 interference, measurement of distance based on arrival time or
5 position locationing, and other techniques which are well known
6 in the art. Alternatively, the mobile user station 202 may
7 simply lose communication with the base station 204 for the first
8 cell 203 and re-establish communication with the base station 204
9 for the adjacent cell 206, also by means of techniques which are
10 well known in the art.

11
12 Figure 3 shows a region with a plurality of independent
13 communication systems.

14
15 In a preferred embodiment, a single region 301 may
16 comprise both a first system 302 and a second system 303 for
17 wireless communication. The cells 203 of the first system 302
18 will be distinct from the cells 203 of the second system 303.
19 Rather than disposing the cells 203 of either the first system
20 302 or the second system 303 in repeated patterns which may
21 clash, the cells 203 each may have a code which is dynamically
22 assigned (or reassigned), with the first system 302 accounting
23 for use by the second system 303 and vice versa.

24
25 In a preferred embodiment, the first system 302 may
26 assign a code to each of the cells 203 based on a limited set of
27 codes and a repeated pattern such as that in figure 1. The
28 second system 303 may then determine those codes in the limited

1 set which are in closest use to the control station 205 for the
2 second system 303. The second system 303 may then select one of
3 the remaining codes, and assign the selected code to the cell 203
4 comprising its control station 205. The control station 205 for
5 the second system 303 may then assign a code to each of the cells
6 203 in the second system 303 based on the same limited set of
7 codes and a repeated pattern such as that in figure 1. In a
8 preferred embodiment, the limited set may comprise three codes,
9 and up to two such closest codes may be determined.

10
11 More generally, the first system 302 and the second
12 system 303 may each assign a code to each of the cells 203 in
13 their respective systems, based on a limited set of common codes.
14 For each of the cells 203, either the first system 302 or the
15 second system 303 will manage the base station 204 for that cell
16 203, and thus be in control of that cell 203. The system in
17 control of that cell 203 may dynamically determine those codes
18 from the limited set which are in closest use to the base station
19 204 for the cell 203, select one of the remaining codes, and
20 assign the selected code to the cell 203.

21
22 It would be clear to one of ordinary skill in the art,
23 after perusal of the specification, drawings and claims herein,
24 that application of the disclosed techniques for dynamic
25 assignment (and reassignment) of codes to cells 203 to a three-
26 dimensional configuration of cells 203, would be workable, and is
27 within the scope and spirit of the invention.

1 In a preferred embodiment, time division is also used.
2 A pulsed-transmitter based system, a minimized number of pulses,
3 and a minimized duration of each pulse reduce the probability of
4 collisions, as is well known in the art. Multiple transmitters
5 may thus all use the same code and the same frequency, as is well
6 known in the art.

7
8 In a preferred embodiment, frequency division is also
9 used. Three techniques are disclosed; the third is a preferred
10 embodiment for many envisioned environments. However, it would
11 be clear to one of ordinary skill in the art, after perusal of
12 the specification, drawings and claims herein, that other
13 techniques would be workable, and are within the scope and spirit
14 of the invention. It would also be clear to one of ordinary
15 skill that these techniques may be used with spread-spectrum
16 frequency offset techniques instead of frequency division.

17
18 (1) If the region 301 comprises only the first system
19 302 alone, two frequencies may be used. All of the base stations
20 204 use a first frequency, while all of the user stations 202 use
21 a second frequency. Accordingly, all of the base stations 204
22 can receive signals from all of the user stations 202, but the
23 use of multiple sufficiently orthogonal spread-spectrum codes
24 allows each base station 204 to reject signals from outside its
25 own cell 203. (Spread-spectrum codes which are highly orthogonal
26 are preferred.) The first frequency and the second frequency
27 must be sufficiently separated so that interference does not
28 occur.

1
2 (2) If the region 301 comprises both the first system
3 302 and the second system 303, frequencies may be assigned
4 dynamically. All of the base station 204 transmitters in each
5 system use a first frequency, selected from a limited set. All
6 of the user station 202 transmitters in each system use a second
7 frequency, also selected from a limited set, not necessarily the
8 same set. Moreover, each system may dynamically assign and
9 reassign frequencies in like manner as disclosed above for
10 dynamic assignment and reassignment of codes. In like manner as
11 to codes, in a preferred embodiment, the limited set may comprise
12 three frequencies, and up to two such closest frequencies may be
13 determined.

14
15 (3) If the region 301 comprises both the first system
16 302 and the second system 303, frequencies may be assigned
17 dynamically. All of the base station 204 transmitters and all of
18 the user station 202 transmitters in each cell 203 use a single
19 frequency, selected from a limited set. Each base station 204
20 dynamically determines those frequencies from the limited set
21 which are in closest use to it, and selects one of the remaining
22 frequencies for use in the cell 203. The base station 204
23 transmitters and the user station 202 transmitters may be time-
24 division duplexed. (Time-division duplexing is well known in the
25 art.) In like manner as to codes, in a preferred embodiment, the
26 limited set may comprise three frequencies, and up to two such
27 closest frequencies may be determined.

1 The amount of separation required between frequencies
2 (while also using code-division and time-division techniques) is
3 dependent upon distance between the user stations 202 in each
4 cell 203, as well as upon the technique used for modulation and
5 demodulation encoded signals. As is well known in the art, some
6 modulation techniques allow for overlapping wideband signals
7 whose center frequencies are offset by a minimum amount necessary
8 to distinguish between otherwise cross-correlating signals. In a
9 preferred embodiment, such modulation techniques may be used,
10 allowing more efficient use of frequency spectrum and allowing
11 frequencies to be reused at closer proximity.

13 Alternative Embodiments

15 While preferred embodiments are disclosed herein, many
16 variations are possible which remain within the concept and scope
17 of the invention, and these variations would become clear to one
18 of ordinary skill in the art after perusal of the specification,
19 drawings and claims herein.

21 For example, it would be clear to one of ordinary skill
22 in the art, after perusal of the specification, drawings and
23 claims herein, that other and further techniques, such as
24 adjustable power control, cell sectoring, directional antennas,
25 and antennae diversity, may be used to enhance a wireless
26 communication system embodying the principles of the invention.
27 Moreover, it would be clear to one of ordinary skill that a

1 system also employing such other and further techniques would be
2 workable, and is within the scope and spirit of the invention.

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CLAIMS

I claim:

1. A wireless communication system, comprising
a repeated pattern of cells, each cell having a base
station;

a user station;

wherein base station transmitters and user station
transmitters in a cell are assigned a spread-spectrum code for
modulating radio communication in that cell;

whereby radio signals used in that cell are spread
across a bandwidth sufficiently wide that both base station
receivers and user station receivers in an adjacent cell may
distinguish communication which originates in one cell from
another; and

whereby said codes are each reused in a plurality of
cells.

2. A wireless communication system as in claim 1,
wherein said repeated pattern comprises a three-dimensional
configuration.

3. A wireless communication system as in claim 1,
wherein said repeated pattern comprises the pattern shown in
figure 1.

1 4. A wireless communication system as in claim 1,
2 wherein said user station transmitters emit data communication
3 messages which include station identification information.
4

5 5. A wireless communication system as in claim 1,
6 wherein said codes are assigned dynamically for each cell.
7

8 6. A wireless communication system as in claim 1,
9 wherein said codes are assigned dynamically for each cell by each
10 of a plurality of independent communication systems, after
11 accounting for use by other systems.
12

13 7. A wireless communication system as in claim 6,
14 wherein said use is concurrent use.
15

16 8. A wireless communication system as in claim 6,
17 wherein said use is prior use.
18

19 9. A wireless communication system as in claim 1,
20 wherein said codes comprise a set of codes with minimal cross-
21 correlation attribute.
22

23 10. A wireless communication system as in claim 1,
24 wherein said codes comprise a limited number of
25 predetermined codes; and

26 wherein said cells are arranged in a repeated pattern
27 of three cells.
28

11. A wireless communication system as in claim 10,
wherein said limited number is three.

12. A wireless communication system as in claim 10,
further comprising time division and frequency division.

13. A wireless communication system as in claim 12,
wherein a plurality of frequencies are assigned dynamically.

14. A wireless communication system as in claim 12,
wherein a plurality of frequencies are assigned dynamically by
each of a plurality of independent communication systems, after
accounting for use by other systems.

15. A wireless communication system as in claim 14,
wherein said use is concurrent use.

16. A wireless communication system as in claim 14,
wherein said use is prior use.

ABSTRACT OF THE DISCLOSURE

1
2
3 A wireless communication system including a repeated
4 pattern of cells, in which base station transmitters and user
5 station transmitters for each cell may be assigned a spread-
6 spectrum code for modulating radio signal communication in that
7 cell. Radio signals used in that cell are spread across a
8 bandwidth sufficiently wide that both base station receivers and
9 user station receivers in an adjacent cell may distinguish
10 communication which originates in one cell from another.
11 Adjacent cells may use distinguishable frequencies and
12 distinguishable codes, but it is sufficient if adjacent cells use
13 distinguishable frequencies and identical codes. A repeated
14 pattern of cells allows the codes each to be reused in a
15 plurality of cells.
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1
2 CERTIFICATE OF MAILING (37 C.F.R. § 10)

3 I hereby certify that this paper (along with any paper referred
4 to as being attached or enclosed) is being deposited with the
5 United States Postal Service on the date shown below as "Express
6 Mail" (Post Office to Addressee) in an envelope addressed to the
7 Commissioner of Patents and Trademarks, Washington, D.C. 20231.

8 Mailing label No. FB209618948 US

9 Date of deposit: April 5, 1991

10 Aide G. Silva
11 printed name

Aide G. Silva
signature of person actually
mailing paper

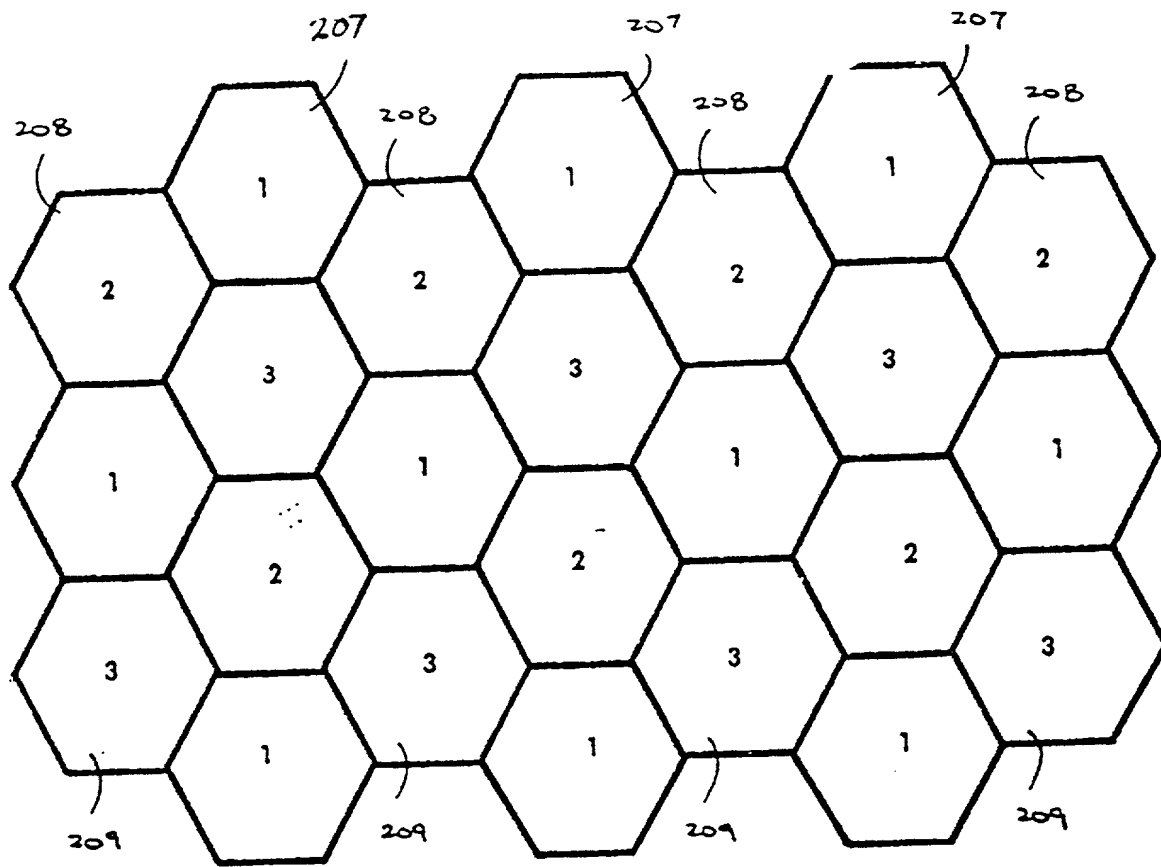
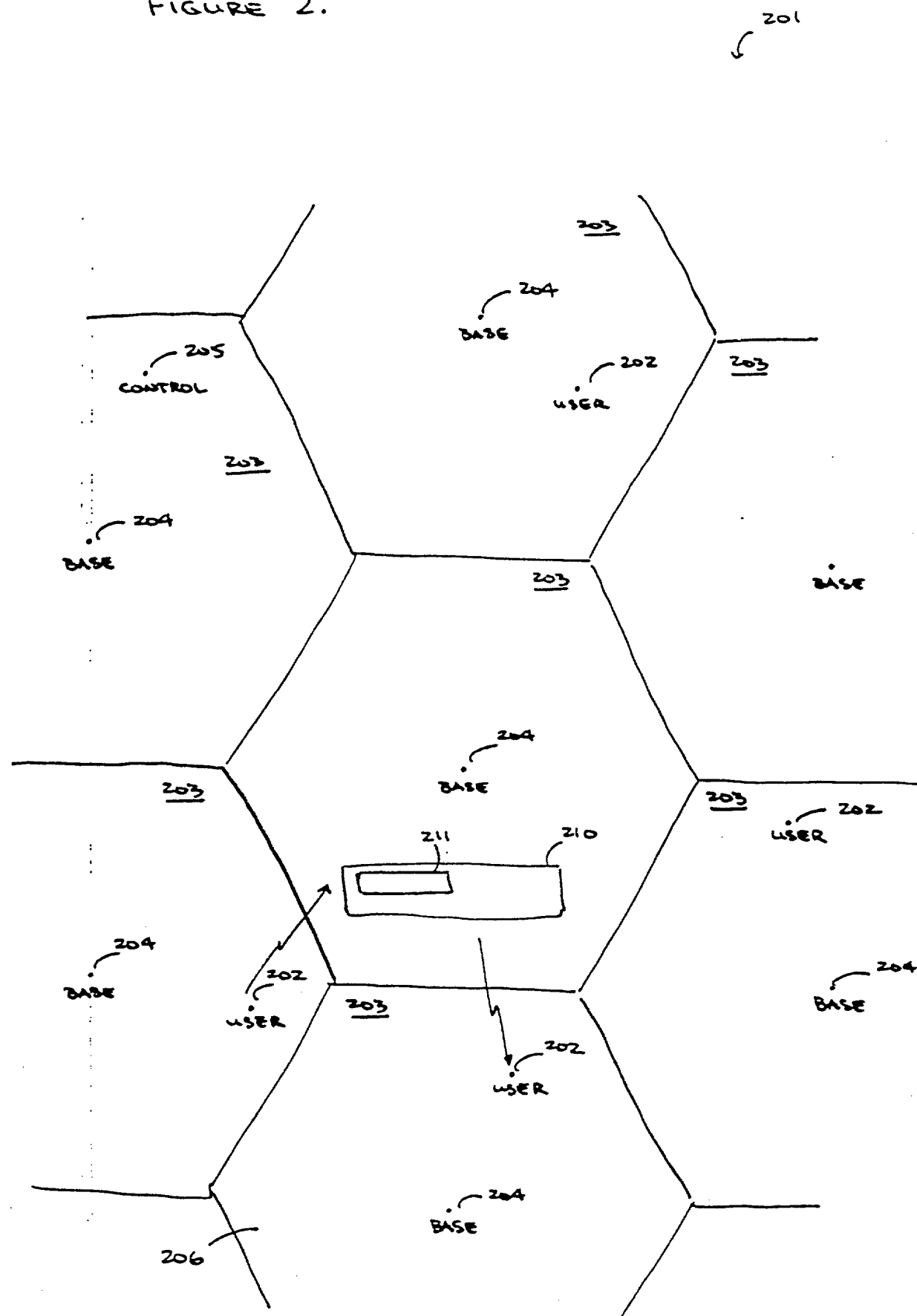


FIGURE 1.

192/270
DIXON, ROBERT C.
Page 1 of 3

FIGURE 2.



192/270
DIXON, ROBERT C.
Page 3 of 3

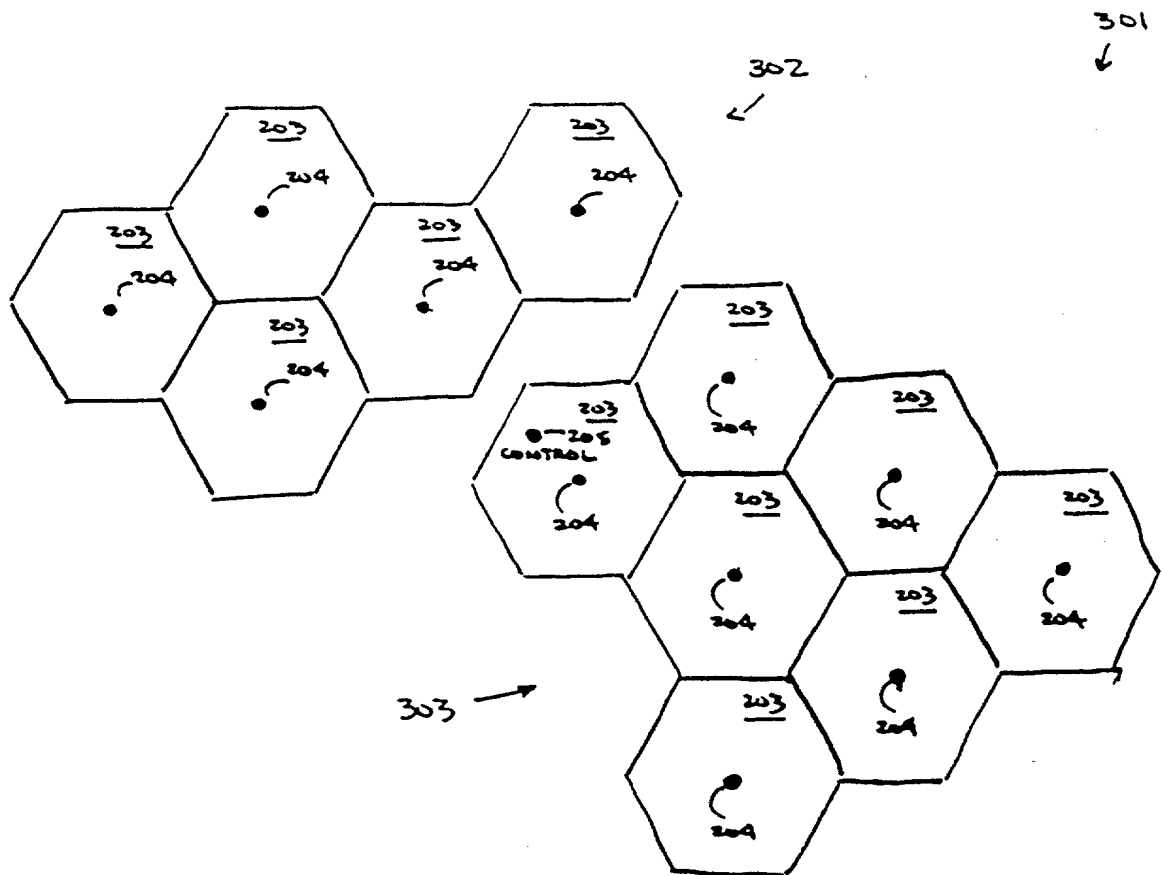


FIGURE 3.

A S S I G N M E N T

WHEREAS, ROBERT C. DIXON, a citizen of the United States, having a post office address at 2120 Hollowbrook Dr., Colorado Springs, CO 80918, invented a new and useful invention, titled "THREE CELL WIRELESS COMMUNICATION SYSTEM", for which I have filed application papers for United States Letters Patent thereon, Serial No. 07/682,050, filed April 8, 1991; and

WHEREAS, OMNIPOINT DATA CO., INCORPORATED, a corporation of the United States, having its principal place of business at 242 Marlboro Street, Boston, MA 02116, is desirous of acquiring the exclusive right, title and interest in and to said invention and in and to the Letters Patent to be granted and issued therefor:

NOW, THEREFORE, for a valuable consideration the receipt of which is hereby acknowledged, I, the said inventor do hereby sell, assign, transfer, and set over unto the said OMNIPOINT DATA CO., INCORPORATED, its successors and assigns, the full and exclusive right, title, and interest in and to the said invention, and in and to any and all Letters Patent to be granted and issued therefor, in the United States of America, its territories and possessions, including all priority rights under

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FEB 5 1991
FBI

the International Convention; and I hereby authorize and request the Commissioner of Patents and Trademarks to issue said Letters Patent to said OMNIPOINT DATA CO., INCORPORATED, it's successors and assigns, in accordance with this Assignment.

Executed at Colorado Springs, Colorado,
this 24th day of May, 1991.

By Robert C. Dixon
Robert C. Dixon

COLORADO
STATE OF ~~CALIFORNIA~~)
COUNTY OF El Paso) ss.

On this 24th day of May, 1991,
before me, a Notary Public, personally appeared ROBERT C. DIXON,
known to me to be the person whose name is subscribed to the
within instrument, and acknowledged that he executed the same.

Lisa Marie Hebanek
Notary Public in and for said
County and State

RECORDED
PATENT & TRADEMARK OFFICE
JUN 10 91

DECLARATION
Utility Application

LYON & LYON
DOCKET INFORMATION

192/270

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled "THREE CELL WIRELESS COMMUNICATION

SYSTEM"

, the specification of which

Check One

☐ is attached hereto.

☒ was filed on April 8, 1991

as

Application Serial No. 07/682,050

and was amended on _____

(if applicable)

I have read the applicable statutes and rules reprinted on the reverse side of this declaration which I understand to describe subject matter which is material under 37 CFR 1.56(a).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Application Number	Country	Date of Filing	Priority Claimed	
			Yes ✓	No ✓

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Application Number	Date of Filing	Status—Patented, Pending or Abandoned

101	FULL NAME OF INVENTOR	FIRST Name ROBERT		Middle Initial(s) C.	LAST Name DIXON	
	RESIDENCE & CITIZENSHIP	City Palmer Lake	State or Foreign Country Colorado		Country of Citizenship United States	
	POST OFFICE ADDRESS	Post Office Address 2120 Hollowbrook Dr.		City Colorado Springs	State or Country Colorado	Zip Code 80918

201	FULL NAME OF INVENTOR	FIRST Name		Middle Initial(s)	LAST Name	
	RESIDENCE & CITIZENSHIP	City	State or Foreign Country		Country of Citizenship	
	POST OFFICE ADDRESS	Post Office Address	City	State or Country	Zip Code	

301	FULL NAME OF INVENTOR	FIRST Name		Middle Initial(s)	LAST Name	
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401	FULL NAME OF INVENTOR	FIRST Name		Middle Initial(s)	LAST Name	
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	POST OFFICE ADDRESS	Post Office Address	City	State or Country	Zip Code	

501	FULL NAME OF INVENTOR	FIRST Name		Middle Initial(s)	LAST Name	
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	RESIDENCE & CITIZENSHIP	City	State or Foreign Country		Country of Citizenship	
	POST OFFICE ADDRESS	Post Office Address	City	State or Country	Zip Code	

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature of Inventor 201	<i>Robert C. Dixon</i>
Date XX	31 May 1991

Signature of Inventor 202	
Date	

Signature of Inventor 203	
Date	

Signature of Inventor 204	
Date	

Signature of Inventor 205	
Date	

Signature of Inventor 206	
Date	

(Signatures should conform to names as presented at 201 et seq. above.)

POWER OF ATTORNEY

DOCKET INFORMATION
192/270

OMNIPOINT DATA COMPANY, INC.

_____, assignee(s) of the application for United States
Letters Patent for an improvement in "THREE CELL WIRELESS COMMUNICATION SYSTEM"
(Title)

by ROBERT C. DIXON

(Inventors)

☐ executed on even date herewith, or☒ having Serial No. 07/682,050 filed April 8, 1991

a copy of the assignment of which is attached hereto, do(es) hereby appoint as attorneys of record with full power of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: Roland N. Smoot, Reg. No. 18,718; Conrad R. Solum, Jr., Reg. No. 20,467; James W. Geriak, Reg. No. 20,233; Robert M. Taylor, Jr., Reg. No. 19,848; Samuel B. Stone, Reg. No. 19,297; Douglas E. Olson, Reg. No. 22,798; Robert E. Lyon, Reg. No. 24,171; James J. Short, Reg. No. 25,922; Robert C. Weiss, Reg. No. 24,939; William E. Thomson, Jr., Reg. No. 20,719; Richard E. Lyon, Jr., Reg. No. 26,300; John D. McConaghy, Reg. No. 26,773; William C. Steffin, Reg. No. 26,811; Coe A. Bloomberg, Reg. No. 26,605; J. Donald McCarthy, Reg. No. 25,119; John M. Benassi, Reg. No. 27,483; James H. Shalek, Reg. No. 29,749; Allan W. Jansen, Reg. No. 29,395; Robert W. Dickerson, Reg. No. 29,914; Kenneth D'Alessandro, Reg. No. 29,144; Roy L. Anderson, Reg. No. 30,240; David B. Murphy, Reg. No. 31,125; Bradford J. Duft, Reg. No. 32,219; James C. Brooks, Reg. No. 29,898; Jeffrey M. Olson, Reg. No. 30,790; and STEVEN A. SWERNOFSKY

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I, the undersigned, declare that I am the (an) assignee of the above-identified application or, if the assignee is a corporation, partnership or other association, I am authorized to make this appointment on behalf of the assignee and I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full Name of Assignee OMNIPOINT DATA CO., INCORPORATED	
Post Office Address 242 Marlboro Street Boston, MA 02116	
Signature of Declarant or Assignee X <i>Evelyn Goldfine</i>	Date X May 30, 1991

Full Name of Assignee	
Post Office Address	
Signature of Assignee	Date

Full Name of Declarant If Other Than Assignee
Title of Declarant
Address of Declarant